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**BEFORE THE BOARD OF PATENT APPEALS
AND INTERFERENCES**

Application Number: 10/655,946
Filing Date: September 04, 2003
Appellant(s): XIE ET AL.

Calvin B. Ward
For Appellant

EXAMINER'S ANSWER

This is in response to the appeal brief filed 27 February 2007 appealing from the Office action mailed 5 December 2006.

(1) Real Party in Interest

The real party in interest is Avago Technologies, LTD.

(2) Related Appeals and Interferences

The examiner is not aware of any related appeals, interferences, or judicial proceedings which will directly affect or be directly affected by or have a bearing on the Board's decision in the pending appeal.

(3) Status of Claims

The statement of the status of claims contained in the brief is incorrect. A correct statement of the status of the claims is as follows:

Claims 1-18 and 20-22 are currently pending in the above identified patent application.

This appeal involves claims 1, 2, 4-11, 13-18 and 20-21.

Claims 3, 12 and 22 are allowed.

(4) Status of Amendments After Final

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The appellant's statement of the status of amendments after final rejection contained in the brief is correct.

(5) Summary of Claimed Subject Matter

The summary of claimed subject matter contained in the brief is correct.

(6) Grounds of Rejection to be Reviewed on Appeal

The appellant's statement of the grounds of rejection to be reviewed on appeal is correct.

(7) Claims Appendix

A substantially correct copy of the appealed claims appears on page 19 of the Appendix to the appellant's brief. The minor errors are as follows: Claim 22 is listed in the Claims Appendix as being under appeal, however, this claim has been allowed and is not under appeal.

(8) Evidence Relied Upon

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| | | |
|--------------|----------------------|---------|
| US 6,963,059 | Lauffenburger et al. | 11-2005 |
| US 6,377,249 | Mumford | 4-2002 |
| US 4,565,947 | Minn | 1-1986 |
| US 5,771,039 | Ditzik | 6-1998 |
| US 5,442,147 | Burns et al. | 8-1995 |

(9) Grounds of Rejection

The following ground(s) of rejection are applicable to the appealed claims:

Claim Rejections - 35 USC § 102

1. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

2. Claims 1-2, 11 and 20 are rejected under 35 U.S.C. 102(b) as being anticipated by Liou (US 5,086,197).

Regarding claims 1 and 11, Liou discloses an apparatus and electronic device for optical navigation on a display screen (Fig. 1, item 11, where the grid pad displays the grid lines) comprising:

a surface comprising an aperture (Fig. 2, the stylus depicted here has an aperture on the surface in contact with surface 11 so that light may reach inside the device),

said surface configured to be moveable against an illuminated surface or a display screen (Fig. 2, see col. 2, lines 45-46, where the grid pad 11 is the illuminated surface and the display screen receiving the projected light) having a detectable texture (see Fig. 9, the grid lines on grid pad 11 constitute a detectable texture);

an optical motion detection circuit integral to said apparatus (see col. 3, lines 29-32, or col. 4, lines 15-16) and optically coupled to said detectable texture of said illuminated surface (see col. 4, lines 33-35, where the grid pad 11 is optically coupled to the detection circuit because the movement of the lines on grid pad 11 are being tracked),

said optical motion detection circuit comprising a single detector (see col. 3, lines 18, where the sensors 14, 14', 16, 16' constitute a single array, which is a single detector) for acquiring images of said surface at a specified rate (It is inherent that an image detector acquires images at a specified rate),

said detector acquiring a single image at a time (Fig. 6, where a combination of images from sensor array 14, 14', 16, 16' constitutes a single image as shown in the Figure), and comprising an image processor producing motion signals indicative of

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motion of said surface relative to said detectable texture of said illuminated surface (Fig.

6, see col. 4, lines 3-9),

wherein said motion signals are produced by comparing two said images and comprise a change in location in a first axis and a change in location in a second axis (See col. 4, lines 3-9),

wherein said optical motion detection circuit is operable to detect said detectable texture without requiring an integral illumination source (Fig. 1, see col. 2, line 52-54, and see col. 5, lines 64-68, where the having the light 10' below the surface with a translucent grid pad 11 is an option without requiring a light source inside the device.)

Regarding claim 2, Liou discloses the apparatus as recited in claim 1 further comprising

an optical element integral to said apparatus (Fig. 2, item 12),

said optical element proximate said aperture (Fig. 2) and receiving light from said detectable texture of said illuminated surface (Fig. 2),

said optical element operable to optically couple said optical motion detection circuit integral to said detectable texture of said illuminated surface (Fig. 2, the lens 12 transmits the image to the lenses 13 and 15, and then to the motion detection circuitry 14 and 16).

Regarding claim 20, Liou discloses a method for optical navigation on an illuminated surface using an electronic device, said method comprising:

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acquiring a first frame from said illuminated surface (Fig. 6E, where each capture 11 is a "frame") at a single detector (see col. 3, lines 18, where the sensors 14, 14', 16, 16' constitute a single array, which is a single detector) of said electronic device, such that said electronic device does not require an internal illumination source to provide illumination to said illuminated surface (Fig. 1, see col. 2, line 52-54, and see col. 5, lines 64-68, where the having the light 10' below the surface with a translucent grid pad 11 is an option without requiring a light source inside the device);

acquiring a second frame at said single detector from said illuminated surface (Fig. 6F);

determining a change in position in a first axis and in a second axis of said electronic device relative to said illuminated surface based on said first frame and said second frame (see col. 4, lines 3-9),

wherein said determining a change in position comprises:

computing correlation values for said first frame and said second frame (see col. 3, lines 46-65, where the values "1" and "0" assigned to the position of the device are correlation values),

after said second frame has been shifted along one of said axes to determine an indication of movement of said electronic device from said first frame to said second frame (The examiner interprets that since the first image and second image taken are what is being compared, that after the first frame has been shifted, i.e. the device has been moved and the image already acquired, then the comparison takes place between

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the two images and the movement is then indicative of the correlation between the two images.);

predicting a shift in position from said first frame based on said correlation values (see col. 3, lines 46-65, where the displacement signals described here a shift from the first frame 'A'); and

outputting a motion signal indicating said shift in position (col. 3, lines 43-65, where the signals 'A'-'D' are motion signals indicating shift in position).

Claim Rejections - 35 USC § 103

3. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

3. The factual inquiries set forth in *Graham v. John Deere Co.*, 383 U.S. 1, 148 USPQ 459 (1966), that are applied for establishing a background for determining obviousness under 35 U.S.C. 103(a) are summarized as follows:

1. Determining the scope and contents of the prior art.
2. Ascertaining the differences between the prior art and the claims at issue.
3. Resolving the level of ordinary skill in the pertinent art.
4. Considering objective evidence present in the application indicating obviousness or nonobviousness.

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4. Claims 4 and 21 are rejected under 35 U.S.C. 103(a) as being unpatentable over Liou (US 5,086,197) in view of Lauffenburger et al. (US 6,963,059).

Regarding claim 4, Liou discloses the apparatus as recited in claim 1.

Liou fails to teach a supplemental light source operable to provide additional illumination onto said illuminated surface in response to said optical motion detection circuit detecting insufficient illumination of said illuminated surface.

Lauffenburger et al. disclose a light source (Fig. 2, item 10) that provides illumination onto a surface in response to an optical motion detection circuit detecting insufficient illumination of the surface (see col. 8, lines 6-12).

Therefore, it would have been obvious to one of ordinary skill in the art at the time of the invention to incorporate the teachings of Lauffenburger et al. in the teachings of Liou to have a supplemental light source integral to the navigation device that could increase the power of said supplemental light source if the detected illumination was deemed too low to improve accuracy in the optical navigation.

Regarding claim 21, Liou discloses a method as recited in claim 20.

Liou fails to teach a method for determining whether illumination provided by said illuminated surface sufficient for said acquiring said first frame; and provided said illumination provided by said illuminated surface is not sufficient for said acquiring said first frame, providing additional illumination onto said illuminated surface.

Lauffenburger et al. disclose a method for optimizing illumination in an optical sensing device that comprises determining whether illumination provided by said illuminated surface sufficient for acquiring a first frame (col. 7, line 15-17, and col. 8, lines 6-12, where each flash is considered a "frame" and detection of any frame can be considered a "first frame" relative to the time when a low light level is detected); and provided said illumination provided by said illuminated surface is not sufficient for said acquiring said first frame, providing additional illumination onto said illuminated surface(col. 8, lines 6-12).

Therefore, it would have been obvious to one of ordinary skill in the art at the time of the invention to incorporate the teachings of Lauffenburger et al. in the teachings of Liou to have a supplemental light source integral to the navigation device that could increase the power of said supplemental light source if the detected illumination was deemed too low to improve accuracy in the optical navigation.

5. Claim 5, 8, 13 and 16 are rejected under 35 U.S.C. 103(a) as being unpatentable over Liou (US 5,086,197) in view of Mumford (US 6,377,249).

Regarding claims 5 and 13, Liou discloses the apparatus as recited in claim 1 and the electronic device for optical navigation on a display screen as recited in claim 11.

Liou fails to teach an internal power source for providing power to said apparatus.

Mumford discloses a light pen comprising an internal power source for providing power to said apparatus (Fig. 21, item 216, see col. 16, line 12).

Therefore, it would have been obvious to one of ordinary skill in the art at the time of the invention to incorporate the teachings of Mumford in the teachings of Liou to have a device that includes a battery as a power supply so that an external power source would not be necessary.

Regarding claims 8 and 16, Liou discloses the apparatus as recited in claim 1 and the electronic device for optical navigation on a display screen as recited in claim 11.

Liou fails to teach an apparatus wherein said illuminated surface is a liquid crystal display and wherein said detectable texture comprises pixels of said liquid crystal display.

Mumford discloses a light pen system wherein said illuminated surface is a liquid crystal display (col. 1, line 11) and wherein said detectable texture comprises pixels of said liquid crystal display (col. 7, line 62 to col. 8, line 3).

Therefore, it would have been obvious to one of ordinary skill in the art at the time of the invention to incorporate the teachings of Mumford in the teachings of Liou to have a detectable texture comprising pixels of a liquid crystal display in order to provide a system in which the writing/detection tablet is not physically separated from the display screen.

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6. Claims 6 and 14 is rejected under 35 U.S.C. 103(a) as being unpatentable over Liou (US 5,086,197) in view of Minn (US 4,565,947).

Regarding claims 6 and 14, Liou discloses the apparatus as recited in claim 1 and the electronic device for optical navigation on a display screen as recited in claim 11.

Liou fails to teach an apparatus wherein said illuminated surface is a cathode ray tube and wherein said detectable texture is a shadow mask of said cathode ray tube.

Minn discloses an apparatus for use with a light pen where the illuminated surface is a cathode ray tube (col. 4, line 12) and said detectable texture is a shadow mask of said cathode ray tube (col. 2, lines 56-58).

Therefore, it would have been obvious to one of ordinary skill in the art at the time of the invention to incorporate the teachings of Minn in the teachings of Liou to have a device that reads the shadow mask of a cathode ray tube so that it can be used directly on the display surface of a cathode ray tube in order to provide a system in which the writing/detection tablet is not physically separated from the display screen.

7. Claims 7 and 15 are rejected under 35 U.S.C. 103(a) as being unpatentable over Liou (US 5,086,197) in view of Ditzik (US 5,771,039).

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Regarding claims 7 and 15, Liou discloses the apparatus as recited in claim 1 and the electronic device for optical navigation on a display screen as recited in claim 11.

Liou fails to teach an apparatus where the illuminated surface is a liquid crystal display and wherein said detectable texture is a diffuser plate of said liquid crystal display.

Ditzik discloses a display device for use with pen/stylus input devices where the illuminated apparatus is a liquid crystal display (Fig. 6A, see col. 7, line 55) and wherein said detectable texture is a diffuser plate of said liquid crystal display (Fig. 6A, item 43, see col. 8, line 64).

Therefore, it would have been obvious to one of ordinary skill in the art at the time of the invention to incorporate the teachings of Ditzik in the teachings of Liou to have a liquid crystal display with a diffuser plate as the illuminated surface in order to utilize a commonly used display device and to have a diffuser to even distribute the backlight over the screen area.

8. Claims 9, 10, 17 and 18 are rejected under 35 U.S.C. 103(a) as being unpatentable over Liou (US 5,086,197) in view of Burns et al. (US 5,442,147).

Regarding claims 9 and 16, Liou discloses the apparatus as recited in claim 1 and the electronic device for optical navigation on a display screen as recited in claim 11.

Liou fails to teach an apparatus where wherein said illuminated surface is overlaid with a semi-transparent layer comprising said detectable texture.

Burns et al. disclose a position-sensing apparatus comprising an illuminated surface (Fig. 31, item 30) overlaid with a semi-transparent layer (Fig. 31, item 14, see col. 43, lines 59-64) comprising said detectable texture (Fig. 31, item 20, see col. 43, line 59 to col. 44 line.7).

Therefore, it would have been obvious to one of ordinary skill in the art at the time of the invention to incorporate the teachings of Burns et al. in the teachings of Liou to have a pattern with a detectable texture overlaid on the illuminated surface in order to be able to use an illuminated surface or display screen for optical navigation where there was no pre-existing detectable surface on it already.

Regarding claim 10 and 18, Liou and Burns et al. disclose the apparatus as recited in claim 9 and the electronic device for optical navigation on a display screen as recited in claim 17.

Burns et al. also disclose a semi-transparent layer comprising unique positioning information (Fig. 1B, item 15) providing absolute position information of said apparatus relative to said illuminated surface or display screen (see col. 7, lines 10-33).

Therefore, it would have been obvious to one of ordinary skill in the art at the time of the invention to incorporate the teachings of Burns et al. in the teachings of Liou to have a pattern with a detectable texture overlaid on the illuminated surface in order to

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be able to use an illuminated surface or display screen for optical navigation where there was no pre-existing detectable surface on it already.

(10) Response to Argument

Limitation 1

The first argument that the applicant makes in regards to the claims, found on page 6 of the Appeal Brief, is that Liou does not teach that the displacement of the apparatus over the illuminated surface is determined from two images of the surface taken by a single detector.

The applicant begins by arguing that since the term “image” is not specifically defined in the present application that one must to what someone of ordinary skill would interpret this to mean. The applicant then states that “it should be noted that the various definitions of an “image” all require that the image is a representation of a thing that closely resembles that thing” and then states that the four signals generated by the apparatus of Liou at any given time do not resemble the grid of lines and therefore Liou does not detect an “image.” The examiner respectfully disagrees. The applicant admits that they do not define in their application what the term “image” is to mean. In fact the claim does not provide any limitation that restricts the interpretation of what the word image is to mean. Nevertheless, the applicant states that the photo detectors of Liou cannot represent an “image” as stated within the claim, however, the applicant is completely wrong and is disregarding the fact that Liou specifically states that an image

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of the grid pad is what is being taken. For example, Column 3, lines 32-39 specifically state: "When any relative displacement occurs between the device 20 and Grid Pad 11, the image in the front of imagery lens 12 shall be changed, and consequently..."

Column 4, lines 32-34 specifically state: "The image of Grid Pad 11 is magnified and then focused on Photo Sensor Array 14, 14', 16, 16' by means of condenser lens or reflective mirrors." Therefore, Liou is clearly stating that the photo detectors are taking an image of the grid pad. Therefore, the applicant's argument is flawed because the image taken in Liou does resemble the grid of lines.

The applicant second argument is that even if one were to interpret the four photodiode signals of Liou as being some form of "imaging array", the arrangement taught in Liou corresponds to two detectors that form two one-dimensional "images", and hence, any two "images" taken by either detector taught in Liou can only provide information along one axis. The applicant states that Liou treats the outputs of each pair of photo detectors separately, and that the signals are not pixels in a two-dimensional image, but rather the results of a mathematical operation performed on an image of the surface to provide signals that are function in the same manner as a pair of conventional encoders. The examiner respectfully disagrees. In the applicant's argument the applicant seems to believe that the signals obtained being treated separately means that "any two images" of Liou cannot be compared. This, however, is not the case. As stated above, Column 4, lines 32-34 specifically state: "The image of Grid Pad 11 is magnified and then focused on **Photo Sensor Array 14, 14', 16, 16'** by means of condenser lens or reflective mirrors." This section of Liou means that one

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image is formed from the four photo sensors. This means that even though the signals may be treated separately for each coordinate, the signals combined together are what form the image. Therefore, "any two images" will be compared to determine the movement of the device and Liou anticipates this feature.

Next, the applicant argues that "the examiner points to the comparison of the outputs from one pair of detectors at different times are corresponding to computing correlation value between two images. Hence, the Examiner admits that each pair of detectors is a separate "imaging array" even in the interpretation put forth by the Examiner. The examiner respectfully disagrees. The examiner never admitted anything because the applicant is wrong with their assertion. As explained above, Column 4, lines 32-34 of Liou mean that one image is formed from the four photo sensors. Therefore, even though the signals may be treated separately for each coordinate, the signals combined together are what form the image. Therefore, "any two images" will be compared to determine the movement of the device and Liou anticipates this feature.

Limitation 2

The second argument that the applicant makes in regards to the claims, found on page 7 of the Appeal Brief, is that Liou does not teach a device having an integral optical motion detection circuit.

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The applicant begins their argument by stating that the circuit of Liou requires an external circuit to convert that signal to one that detects motion, and hence, the motion detection circuit is not integral to the apparatus of Liou. The applicant then states that the word "integral" in the dictionary means "Essential or necessary for completeness; constituent"; and "Possessing everything essential; entire," and that Liou does not teach a circuit with any of these characteristics. Further, the applicant states that "The issue is not whether Liou teaches a system that excludes an external circuit but whether Liou teaches the integral limitation of the claim either explicitly or inherently" and that the Examiner has not pointed to any teaching of an "integral motion detector." The applicant further states that the examine must be implying that this feature is inherent in Liou, and that the teaching of Liou is not necessarily present as required by the doctrine of inherency. The examiner respectfully disagrees.

First of all, the applicant's argument is flawed because the claims do not define within them what the word "integral" means. The applicant states that they disagree that the word "integral" includes an "external" circuit. The applicant even admits that Liou has a motion detection circuit that is located externally. Therefore the applicant is really saying that the external circuit is not "integral", i.e. essential, to the apparatus, however, this is not the case. The apparatus taught by Liou, i.e. the entire device shown in Figures 1 and 2, would not work without a motion detection circuit, and thus based on the definitions given by the applicant, the motion detection circuit would have to be "integral" to the device. Without the detection of the movement of the device, it cannot be determined where the device has moved, and as stated in column 1, lines 8-

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10 “The invention serves as a man-machine interface using 2-dimensional displacement detection” which means that movement detection is “integral” to the device. The applicant states that the examiner has not pointed to any teaching and thus is implying the feature is inherent, however, the examiner, as explained has proved that the motion detection would be “integral” to the device.

Limitation 3

The third argument that the applicant makes in regards to the claims, found on page 8 of the Appeal Brief, is that Liou does not teach a device that acquires images at a specified rate.

The applicant begins their argument by stating that the examiner's argument rest on the premise that every device samples at a finite fixed frequency to provide its output and that this is clearly not the case, since numerous examples of devices that provide a signal that changes continuously in time are known. The examiner respectfully disagrees. The applicant states that many devices are known where the signal changes continuously are known, however, does not provide any examples of such devices. Further, all devices known to one of ordinary skill in the art is going to work based on a frequency. No device in the art works continuously, and the applicant has failed to provide any evidence that proves the examiner incorrect.

Instead, the applicant continues their spurious argument by stating that Liou outputs 4 signals on a continuous basis and that there is no teaching that the signals

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are output at a predetermined frequency. The applicant also states that “while a device receiving the signals might sample the signals at a fixed frequency, there is no such teaching in Liou and such sampling is not required. The examiner respectfully disagrees. The applicant keeps using the word “sampling” in their argument, however, this word is not used in the claims. The claims only require that the detector is used for “acquiring images at a specified rate.” The word sampling has nothing to do with the claims. Instead, as stated by the examiner previously, the device would operate at some frequency and thus the image would be acquired at a “specified rate.”

The applicant further argues that an incorrect sampling rate could lead to a position error if regular sampling strategy were utilized in the apparatus of Liou, which could lead to the change in position not being detected. This argument is directed to the accuracy of the device and has nothing to do with whether or not Liou acquires images at a “specified rate.” This could happen with any device that acquires images at a specified rate. Even the applicant’s invention could be subject to such a problem. Since, as stated in the applicant’s specification, the device acquires two thousand images per second (See page 9, lines 20-21). Therefore, in-between two of these samples, the device could be moved as stated by the applicant in their argument and the movement would not be detected since the images would look the same. Therefore the rate at which the images are sampled will have something to do with this problem and the faster the images are acquired, then the better the accuracy of the device. This accuracy, however, has nothing to do with whether or not Liou inherently teaches the images acquired at a “specified rate.”

Limitation 4

The fourth argument that the applicant makes in regards to the claims, found on page 8 of the Appeal Brief, is that Liou does not teach a method in which two image frames are shifted along one axis and correlation values are computed to determine the actual position shift of a device over an illuminated surface. The applicant argues this by stating that "The relevant claim limitation requires that two frames be formed, one of the frames shifted with respect to the other frame, and then a correlation value be computed. The Examiner has not pointed to any shifting of frames. At best, one could argue that Liou teaches comparing two corresponding pixels in two frames taken at different times, but without shifting." The examiner respectfully disagrees. The examiner specifically states in the rejection of claim 20, that the examiner interprets the "shifting" along the axis to be the device being moved (See the Final Rejection, page 10, lines 5-11.). Therefore, the examiner has pointed to the shifting and since the applicant does not provide any reasons as to why this is not the claimed shifting, Liou does teach this limitation.

Limitation 5

The fifth argument that the applicant makes in regards to the claims, found on page 9 of the Appeal Brief, is that Liou requires an integral illumination device. To

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support this argument, the applicant states Figure 1 shows the apparatus taught by Liou as including a light source 10 or 10' and thus the fact that 10' is positioned outside one component of the apparatus does not mean that it is not an integral part of the apparatus. The examiner respectfully disagrees. The claims never state what the word "integral" means. The claim only states "wherein said optical motion detection circuit is operable to detect said detectable texture without requiring an integral illumination source." The examiner interpreted that since light source 10' can be provided outside of the pen device 20 where the photo sensors are located, that the light source 10' is therefore not "integral" to that part of the device. Since the claims do not define what is meant by the word "integral" there is nothing preventing the examiner from interpreting the claim in that manner. Therefore Liou does teach this limitation.

Rejection of Claims 1, 2, 4-11, 13-18, 20-21

Rejection of Claims 1-2, 11 and 20 under 35 U.S.C. 102(b) as being anticipated by Liou

First, the applicant states under the heading "*Rejection of claims 1-2, 11 and 20 under 35 U.S.C. 102(b) as being anticipated by Liou*" that "with regard to the limitation in claim 1 requiring an integral optical motion detection circuit, the Examiner states that the 'claim never states this limitation'. Applicant must dispute this statement, as Claim 1 clearly specifies 'an optical motion detection circuit integral to said apparatus.' The

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examiner respectfully disagrees because the claim states "an optical motion detection circuit integral to said apparatus" **not** "an integral optical motion detection circuit" as asserted by the applicant. The wording of the claim is clearly different.

Second, the applicant states that Claims 1, 2 and 11 require the limitations 1, 2, 3 and 5 discussed above, and that the applicant maintains that Liou does not teach these four limitations, however, as explained by the examiner above, Liou anticipates the limitations 1, 2, 3 and 5 discussed above and therefore, Liou anticipates these claims.

Finally, the applicant states that Claim 20 requires the limitations 1, 4 and 5 discussed above, and that the applicant maintains that Liou does not teach these three limitations, however, as explained by the examiner above, Liou anticipates the limitations 1, 4 and 5 discussed above and therefore, Liou anticipates these claims.

Rejection of Claims 4 and 21 under 35 U.S.C. 103(a) as being unpatentable over Liou in view of Lauffenburger

The applicant argues claims 4 and 21 stating that these claims require that the apparatus include a supplemental light source that provides additional illumination of the surface in response to the optical motion detection circuit detecting insufficient illumination of the surface. First, the examiner would like to point out that claim 21 does not recite this limitation. Claim 21 merely states "determining whether illumination provide by said illuminated surface sufficient for said acquiring said first frame; and provided said illumination provided by said illuminated surface is not sufficient for said

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acquiring said first frame, providing additional illumination onto said illuminated surface.”

This does not provide the limitation of a “supplemental” light source.

The applicant's main argument against the examiner's rejection is that “as best Applicant can understand the Examiner's current grounds in this rejection, Applicant assumes that the Examiner is arguing that one would be motivated to change the light sources in the apparatus of Liou to arrive at an apparatus that satisfies the limitations of Claims 4 and 21.” The applicant then states that three separate changes would be required to accomplish this: 1) A circuit that determines that there is insufficient illumination would need to be added to the apparatus of Liou 2) The apparatus of Liou would need to be modified to include both of the light sources rather than one or the other as now taught in Liou and 3) The apparatus would be modified to run on only one of the light sources unless the new circuit determined that the light levels were too low. The applicant has completely misunderstood the statement made by the examiner in the Advisory action dated February 2, 2007. First, the examiner would like to point out that not only do the claims not require two light sources, the claims also do not define what the term “supplemental light source” means. Therefore, the examiner did not interpret that both of the light sources taught in Liou would be used at the same time. The examiner instead stated that since either of the light sources could be used to “supplement” the other, i.e. when the device is made, Liou explains that the device could be built with either light source 10 or 10' as shown in Figures 1 and 2, Liou therefore teaches a supplemental light source. Then, based on the teachings of

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Lauffenburger, the light source could provide extra illumination when illumination is insufficient for detection.

The applicant then states that since the teaching of claims 1 and 20 from which claims 4 and 21 depend are not found in Liou, that the examiner has not made a *prima facie* case for obviousness with respect to claims 4 and 21, however, as explained by the examiner above, a *prima facie* case of obviousness with respect to claims 4 and 21 has been established.

Next, the applicant argues that Liou does not teach an embodiment when both of the light sources are provided, however, as explained above the examiner agrees with this and that the examiner never said that both light sources were to be used in one embodiment, but rather can be used to replace one another such that one “supplements” the other. Once again the examiner would like to point out that nowhere in the claims is it required that two light sources must be used.

The applicant then argues the first alteration mentioned above, “A circuit that determines that there is insufficient illumination would need to be added to the apparatus of Liou.” The applicant argues this by stating that the Examiner has not pointed to any teaching in the reference of Liou that the light source would change intensity over time, and that the light source provided in Liou was designed and remains constant throughout the lifetime of the apparatus. The examiner respectfully disagrees. First of all, the applicant cannot presume to know that Liou designed the device such that the illumination would remain constant throughout the lifetime of the apparatus. Furthermore, if the device were operated in a very bright room, the light detected would

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be different than the light detected in a very dark room, and thus a light source that can change in intensity would be ideal to improve accuracy of the device. The Liou reference does not need to teach why its device would need to be modified, but rather the reason for modifying Liou used by the examiner is found in the Lauffenburger reference.

The applicant's next two arguments are with respect to the second and third alterations that "The apparatus of Liou would need to be modified to include both of the light sources rather than one or the other as now taught in Liou" and "The apparatus would be modified to run on only one of the light sources unless the new circuit determined that the light levels were too low," however, as explained above the applicant has misinterpreted the examiner's rejection and thus these arguments are irrelevant to how the examiner rejected the claims. Thus the rejection of claims 4 and 21 under 35 USC 103(a) is proper.

Rejection of Claims 5, 8, 13 and 16 under 35 U.S.C. 103(a) as being unpatentable over Liou in view of Mumford

The applicant argues the rejection of claims 5 and 13 by stating that since Liou does not teach the limitations of claims 1 and 11 and Mumford does not provide for these missing teachings that the Examiner has not made a *prima facie* case for obviousness with respect to claims 5 and 13, however, as explained above, Liou does

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teach the limitations of claims 1 and 11 and therefore a *prima facie* case for obviousness with respect to claims 5 and 13 has been made.

The applicant argues the rejection of claims 8 and 16 by stating that since Liou does not teach the limitations of claims 1 and 11 and Mumford does not provide for these missing teachings that the Examiner has not made a *prima facie* case for obviousness with respect to claims 8 and 16, however, as explained above, Liou does teach the limitations of claims 1 and 11 and therefore a *prima facie* case for obviousness with respect to claims 8 and 16 has been made.

The next argument made by the applicant in regards to the rejection of claims 8 and 16 is that the combination of Liou and Mumford is improper. The applicant states that there is a fundamental problem in using the apparatus of Liou to determine the position of the reading head on a surface that displays another scene because if another pattern is present on the display, the photodiodes and optics must process a pattern that is the sum of the two patterns. The applicant finishes the argument by stating that the only possible combination that might produce an operable device is one in which the grid pattern is generated on the display and no other pattern is generated with it and that the Examiner has not pointed to any advantage of such a device over that taught in Liou. The examiner respectfully disagrees. The applicant's interpretation of how the references "must" be combined is incorrect. The examiner's combination of the references, as stated in the rejection, was that Liou fails to teach that the illuminated surface is a liquid crystal display and wherein said detectable texture comprises pixels of said liquid crystal display. The examiner then used Mumford to teach of a light pen

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system where the illuminated surface is a liquid crystal display and wherein said detectable texture comprises pixels of said liquid crystal display. The examiner's combination of the references then was to make the device of Liou, instead of detecting a grid pattern, to detect the pixels on a liquid crystal display in order to provide a system in which the writing/detection tablet is not physically separated from the display screen. This would be advantageous because in the apparatus of Liou the detectable grid and the display have to be separated from one another, however, if the device detected the pixels on a display screen (without the grid as taught in Mumford), there would be only one device and thus efficiency would be increased and cost would decrease. Therefore there is an advantage to the combination of the references.

The applicant next states that replacing the illuminated grid pattern in Liou with a liquid crystal display does not provide any advantage in the device taught by Liou and instead would increase the cost and decrease the accuracy of the device, however, as explained above, there is an advantage and cost would decrease. The applicant states that the encoder of Liou depends on a specific pattern on the illuminated surface generated using photolithography and that even if a liquid crystal display could provide the same accuracy as the printed patterns of Liou, nothing would be accomplished other than an increase in the cost of the encoder system taught by Liou. The examiner respectfully disagrees. As stated above, the applicant is assuming that the device after combination would still need to be detecting a grid pattern as taught by Liou, however, in the combination made by the examiner the grid pattern is replaced in Liou such that the pixels of the liquid crystal display would be detected. As stated above, this provides

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for an advantage because in Liou, one would need a display and the detectable texture pattern, where in the device taught by the combination of Liou and Mumford will only need a display. Accordingly, there is plenty of reasonable expectation of success in making the substitution suggested by the Examiner. Hence, the rejection of claims 8 and 16 should be maintained.

Rejection of Claims 6 and 14 under 35 U.S.C. 103(a) as being unpatentable over Liou in view of Minn

The applicant argues the rejection of claims 6 and 14 by stating that since Liou does not teach the limitations of claims 1 and 11 and Minn does not provide for these missing teachings that the Examiner has not made a *prima facie* case for obviousness with respect to claims 6 and 14, however, as explained above, Liou does teach the limitations of claims 1 and 11 and therefore a *prima facie* case for obviousness with respect to claims 6 and 14 has been made.

The applicant's first argument is that any additional information on the display besides the grid pattern would cause the apparatus of Liou to be inoperative with respect to providing its navigation function, however, as explained above, the examiner's combination of the references then was to make the device of Liou, instead of detecting a grid pattern, to detect the pixels on a CRT in order to provide a system in which the writing/detection tablet is not physically separated from the display screen. Thus the grid pattern is no longer presented in the combination of the references.

The second argument made by the applicant is that Minn is directed to providing a better phosphor composition for the surface of the cathode ray tube and that there is no teaching in Minn of reading the shadow mask and that in fact, the scheme taught therein operates on cathode ray tubes that lack any form of shadow mask. The examiner respectfully disagrees. As point out in the rejection by the examiner, column 2, lines 56-58 of Minn specifically states that "...the present invention to provide an improved shadow mask CRT for use with a light pen." One of ordinary skill in the art would recognize that, as explained in column 1, lines 22-26 of Minn, that the shadow mask is disposed adjacent to the display screen between the screen and the electron gun and has apertures that allow the passage of the beam to strike only one group of the elemental phosphor areas. As explained by the examiner on page 4, lines 16-20 of the Final rejection, since the light pen of Minn determines the position when it detects light, and the electron beam diameter after passing through the shadow mask determines the pixel sizes and light emitted, the shadow mask is "detected" as required by the claims. Anyone of ordinary skill in the art would have known this, and thus Minn does detect the shadow mask, whether it is indirectly or not. Furthermore the applicant has completely contradicted his or her own reading of the reference. The applicant first states "Minn teaches a light pen that operates on the surface of a cathode ray tube having a shadow mask" then the applicant ends by stating "In fact, the scheme taught therein operates on cathode ray tubes that lack any form of shadow mask." Therefore the examiner is unsure what the applicants position actually is on the device of Minn having a shadow mask, however, the examiner notes that in column 2, lines 56-58 of

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Minn it specifically states that the cathode ray tube has a shadow mask. Therefore, Minn does teach of "detecting" the shadow mask.

The applicant's third argument is that the apparatus of Liou depends on the detected pattern being constantly illuminated over the entire portion of the pattern that is view by the photodiodes and that a cathode ray tube only illuminates one point at a time, hence, the resultant apparatus would not function without additional modifications. The examiner respectfully disagrees. Cathode ray tubes do scan the screen, however, this is done at such a speed that it is unrecognizable and thus the entire surface of the screen gives the impression of being constantly illuminated. Thus the pattern would be available for the light pen to detect movement. The applicant states that the apparatus would not function without additional modifications, however, has provided no proof that modifications would be required and has not pointed out as to what those modifications would need to be. The examiner understands that if the cathode ray tube is used for a light pen system that is able to detect the screen and determine the movement and thus when combined with Liou the device will still function.

The applicant's fourth argument is that the Examiner has not pointed to any teaching that the shadow mask of a conventional CRT provides the grid pattern required by the apparatus of Liou, however, as stated above, the grid pattern is no longer needed after the combination is made. The applicant is assuming that the device after combination would still need to be detecting a grid pattern as taught by Liou, however, in the combination made by the examiner the grid patter is replaced in Liou such that

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the pixels of the CRT will be detected. Thus the rejection of claims 6 and 14 should be maintained.

Rejection of Claims 7 and 15 under 35 U.S.C. 103(a) as being unpatentable over Liou in view of Ditzik

The applicant argues the rejection of claims 7 and 15 by stating that since Liou does not teach the limitations of claims 1 and 11 and Ditzik does not provide for these missing teachings that the Examiner has not made a *prima facie* case for obviousness with respect to claims 7 and 15, however, as explained above, Liou does teach the limitations of claims 1 and 11 and therefore a *prima facie* case for obviousness with respect to claims 7 and 15 has been made.

The applicant's first argument is that the combination of the apparatus of Liou with a display screen is only operable if the display screen is limited to displaying the grid pattern taught in Liou, however, as explained above the examiner's combination of the references then was to make the device of Liou, instead of detecting a grid pattern, to detect the pixels on a liquid crystal display in order to provide a system in which the writing/detection tablet is not physically separated from the display screen. Thus the grid pattern taught by Liou is no longer presented in the combination of the references.

The applicant's second argument is that the diffuser plate taught in Ditzik does not have a detectable texture. Furthermore the applicant argues that if the plate consisting of scattering particles having dimensions of the order of the wavelength of

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the light from the light source will provide the desired diffusion property without presenting a texture that can be imaged, and that the goal of a diffuser plate is to blur any detectable pattern present in the light source that is illuminating the liquid crystal display. The examiner respectfully disagrees. The applicant's argument is based on the premise that a diffuse plate cannot have a detectable pattern on it, however, the applicant themselves are claiming a diffuser plate having a detectable pattern, and therefore if the diffuser plate of Ditzik cannot have a detectable pattern then neither can the diffuser plate taught by the applicant's. However, if the applicant can have a detectable texture on their diffuser plate, then a detectable texture can be put on the diffuser plate taught by Ditzik.

The applicant's third argument is that the diffusion plate taught by Ditzik is behind the liquid crystal display panel, and thus there is no stable pattern that is visible through the liquid crystal display, and hence there is no reasonable expectation of success. The examiner respectfully disagrees. The claims do not require the location of the diffuser plate to be on top of the liquid crystal display panel, and thus Ditzik does not need to teach such a feature. Since the light pen will be detecting the pixels of the liquid crystal display panel, which are made to illuminate based on light provided by the diffuser plate, then the diffuser plate is what is creating the detectable texture, and thus the diffuser plate can be considered to have a "detectable texture." There are no claim limitations preventing the examiner from such an interpretation and thus there is a reasonable expectation of success in the combination of Liou and Ditzik. Accordingly, the examiner has made a *prima facie* case for obviousness with respect to claims 7 and 15.

Rejection of Claims 9, 10, 17 and 18 under 35 U.S.C. 103(a) as being unpatentable over Liou in view of Burns et al.

The applicant argues the rejection of claims 9, 10, 17 and 18 by stating that since Liou does not teach the limitations of claims 1 and 11 and Burns does not provide for these missing teachings that the Examiner has not made a *prima facie* case for obviousness with respect to claims 9, 10, 17 and 18, however, as explained above, Liou does teach the limitations of claims 1 and 11 and therefore a *prima facie* case for obviousness with respect to claims 9, 10, 17 and 18 has been made.

The applicant's next argument is with respect to claims 10 and 18 in that the pattern taught by Burns would not be operable in the device of Liou and thus the device would not function. The applicant states that the apparatus taught by Liou requires a repetitive pattern, while the pattern taught by Burns changes and thus the combination would not be operative. The examiner respectfully disagrees. The applicant is individually attacking the references when the rejection was made using a combination of references. Burns was used to teach that a detectable pattern can be put in a semi-transparent layer such that it can be overlaid on a surface of a display that does not already have a detectable surface. When put into combination with Liou, the detectable pattern taught by Liou can be made into a semi-transparent layer. The pattern taught by Burns does not have to replace the pattern taught by Liou as asserted by the applicant.

Secondly the applicant states that to provide absolute position information, the pattern must change as one moves position to position on the surface and that the apparatus of Liou is incapable of detecting such changes and hence the encoder of Liou only detects relative changes in position and could not provide an absolute position indication without further alterations. The examiner respectfully disagrees. Once again the applicant is individually attacking the Liou reference when the rejection is made based on a combination of references. Burns does teach of measuring the absolute position of the device, and when used in combination with Liou, the device created would also be capable of detecting the absolute motion of the device. The applicant is arguing against the references individually, however, one cannot show nonobviousness by attacking references individually where the rejections are based on combinations of references. See *In re Keller*, 642 F.2d 413, 208 USPQ 871 (CCPA 1981); *In re Merck & Co.*, 800 F.2d 1091, 231 USPQ 375 (Fed. Cir. 1986). Accordingly, the rejection of claims 10 and 18 should be maintained.

(11) Related Proceeding(s) Appendix

No decision rendered by a court or the Board is identified by the examiner in the Related Appeals and Interferences section of this examiner's answer.

(12) Conclusion

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For the above reasons, it is believed that the rejections should be sustained.

Respectfully submitted,

Stephen Sherman

Conferees:

Amr Awad

Bipin Shalwala

 AMR A. AWAD
SUPERVISORY PATENT EXAMINER

